REMARKS

The instant application discloses (Example 1) a foamable composition which can be used in the production of various structural panels, e.g., those of Figs. 6 and 34, in which there is a surface layer chemically and mechanically bonded to a body of a thermoset, cellular urethane. To produce a structural panel, such a composition as that disclosed in Example 1 is introduced into a mold so that it is in contact with a surface to which a thermoset cellular urethane is to be chemically and mechanically bonded. The composition is then confined so that CO_2 which is formed causes foaming, which forces it into intimate contact with the surface while chemical reaction which produces the thermoset cellular urethane proceeds. The paragraph which bridges pages 24 and 25 of the application, as has been discussed previously, shows that high strength is achieved by the process described thus far, but that the strength is greatly reduced when chemical and mechanical bonding between the surface and the foamable composition is prevented

Claims 7 and 9 are rejected, 35 USC 102(e), as being anticipated by US patent 6,085,485 ("Murdock"). The rejection is respectfully traversed for the reasons explained below.

Murdock discloses (Fig. 1) "a first preferred embodiment of the load-bearing prefabricated building construction panel according to the present invention", (Fig. 4) "a second preferred embodiment of the load bearing pre-fabricated building construction panel according to the present invention" and (Fig. 7) "an alternative embodiment of the load bearing pre-fabricated building construction panel according to the present invention" The following brief descriptions of the "panel" appear in the patent:

> "Reference will now be made to FIGS. 1 through 3, which show a first preferred embodiment of the load bearing pre-fabricated building construction panel 20 of the present invention. The building construction panel 20 comprises a main body portion 22 having length "L", thickness "T", and width "W". A sheet metal outer skin 24 is disposed substantially at the exterior of the main body portion 22 and has opposed front and back portions 26,28 adjoined by first and second side portions 30,32 to form a substantially

hollow core 34, with an insulative material disposed within the substantially hollow core34." (column 6, lines 24-34)

"Reference will now be made specifically to FIGS. 4 through 6, which show the second preferred embodiment of the building construction panel of the present invention. The second preferred embodiment is substantially similar to the first preferred embodiment and accordingly like reference numerals are used to designate like parts . . ." (column 7, lines 39-44). The reference numerals in the foregoing quotation concerning Figs. 1-3 are unchanged in Figs. 4 through 6.

Reference will now be made specifically to FIG. 7, which shows an alternative embodiment load bearing pre-fabricated building construction panel 70. . . . The alternative embodiment building construction panel 70 illustrated in FIG. 7 comprises a main body portion 72 having length "L", thickness "T", and width "W". A sheet metal outer skin 74 is disposed substantially at the exterior of the main body portion and has opposed front and back portions 76,78 adjoined by first and second side portions 80,82 to form a substantially hollow core 84, with an insulative material disposed within the substantially hollow core 84." (column 7, line 57 to column 8, line 5)

Murdock also includes the following description of the "insulative material disposed within the substantially hollow core 34" of the first and second embodiments of the panel according to the invention:

"During manufacture of the first preferred embodiment of the building construction panel 20, the second skin element 41 is placed horizontally with the back portion 28 resting on a suitable support and the . . . first and second side portions 30,32 and the rib member 50 projecting upwardly. Temporary inserts (not shown) are placed in substantially sealed relation with respect to the ends of the building construction panel 20, so as to in essence form an open-top reservoir into which a suitable foam insulation is poured." (column 7, lines 29-38)

Finally, Murdock includes the following disclosure:

> "The urethane fire retardant core is of high density, which is adapted to varying specifications depending on application and panel thickness. This urethane core fills fully all the spaces and vacant interstices within the panel once the continuous member steel "Z" or "C" section has been placed and secured to the top and bottom steel sheaths of the panel, such as by stitch welding." (column 8, last line through column 9, line 6)

The terms "suitable foam insulation" and "urethane fire retardant core" appear in the foregoing quotations from Murdock, which also indicates that the "suitable foam insulation" is something that is "poured" into "an open-top reservoir". Although the reference does not define the "suitable foam insulation", various patents disclose materials that are believed to be suitable. For example, US patent 4,263,409 discloses the production of what it calls "a foamed thermoplastic composition" by "blending a minor amount of a foaming agent with a thermoplastic resin in an extruder and comminuting the resultant extrudate." (see the abstract) Indeed, 190 patents were found by a "quick search" of PTO records for patents in which the words "expanded bead" appeared together. The "foamed thermoplastic composition" of US 4,263,409 and similar compositions disclosed in many of the other "expanded bead" patents are believed to be suitable.

It is clear that the present application does not disclose a "suitable foam insulation" in the sense of the Murdock reference. Example 1 of the instant application describes the production a thermoset urethane foam by a process which involves the production of Dyligomer I from castor oil, an isomer blend of 80 percent 2,4-TDI and 20 percent 2,6-TDI, 1,4-but-2-ene diol and dibutyltin dilaurate, the preparation of an intermediate composition by thorough mixing of 100 parts of a solution of the Dyligomer I, 28.1 parts of triallyl cyanurate, 1 part of benzoyl peroxide, 1.5 parts of cobalt naphthenate, 1 part of dimethyl aniline, 1.2 parts of a silicone surfactant, 90 parts of 5 micron calcium carbonate (325 mesh), 0.5 part of water and 1 part of a polymeric colorant, and the production of a structural member according to the instant invention from a mixture of the intermediate composition and a liquified MDI. The structural member is that indiicated generally at 10 in FIG. 6, which is composed of an aluminum floor 11, a cured cellular

body 12 of a thermoset material according to the invention, and an expanded polystyrene sheet 13.

The instant application includes the following description of the production of the structural member 10:

> "The member 10 can be produced in a mold 14 (FIG. 2) which has sidewalls 15, a bottom 16 and a top 17 which is attached to one of the sidewalls 15 by a hinge 18. Producing the member 10 involved placing the aluminum floor as indicated generally at 19 on the bottom 16 of the mold 14, introducing a predetermined quantity of a mixture of liquefied MDI and the intermediate composition produced as described above into the floor 11 inside the mold 14, placing the expanded polystyrene sheet 18 on top of the mixture, and closing the top 17 of the mold 14. The mold 14 is shown in FIG. 3 with a quantity of the MDI/intermediate composition, designated generally at 20, inside the aluminum floor 19, in FIG. 4 with the expanded polystyrene sheet 13 on top of the MDI/intermediate composition 20 and with the top 17 closed, and in FIG. 5 after the composition 20 has foamed and cured so that it is the thermoset foam 12. As an incident of the foaming of the composition 20, the expanded polystyrene sheet 13 has been forced against the top 17 of the mold 14 and the foaming composition has been forced into intimate contact with the aluminum floor 11 and with the expanded polystyrene sheet 13."

It is clear that the "mixture of liquefied MDI and the intermediate composition produced as described above" is not "a suitable foam insulation" that could be poured into what Murdock (column 7, lines 29-38) characterizes as "in essence an open-top reservoir". In the first instance, the mixture is not a foam, and, in the second instance, if it were so poured, it would expand to some height which could be either above or below the top of the "open top reservoir" and would depend upon the amount of the material poured into the "open top reservoir". Upon completion of the reaction which commences when the "mixture of liquefied MDI and the intermediate composition produced as described above" is produced there would be a cellular body of a urethane at least partially filling the "open top reservoir". The cellular body that is produced when the method of the example is complete could not be poured.

The foregoing discussion makes it clear that claims 7 and 9 of the instant application are not anticipated (35 USC 102) by Murdock. It is submitted that Murdock does not make the claims obvious (35 USC 103). Claims 7 and 9 require the "surface layer of another material" to be "chemically and mechanically bonded to at least one of the opposed major surfaces." The following paragraphs from the instant application (paragraph bridging pages 24 and 25, and the following paragraph) demonstrate the importance of the "mechanically and chemically bonded" limitation of the claims:

> "An aluminum member having the shape of the floor 19, but made from thin sheet material, was used to produce a structural member similar to a part of the member 10. The specific member used was so thin that, when it was suspended between two supports which extended transversely of its channels, and were separated from one another by twelve inches, a load applied in the center of the member caused it to collapse before available instrumentation indicated the magnitude of the load. An identical aluminum member was then placed in the mold 14 (FIG. 11); the mold was charged with 568 g per 929 cm^2 of the intermediate/isocyanate composition produced as described above with reference to FIG. 1; a sheet of thin polyethylene was placed over the foamable composition; a sheet of expanded polystyrene was placed in the mold, above the polyethylene sheet; and the lid 17 was closed, and clamped shut. The composition expanded to fill the available space inside the mold 14, and cured to such an extent that it could be removed from the mold after about 10 minutes; it had an apparent density of about 0.20 gm per cc. After the foamed composition had cured for about 48 hours, the member, when it was suspended between two supports which were circular in cross section and extended transversely of its channels, and were separated from one another by twelve inches on centers, withstood a load of 4560 pounds before failure. The load was applied by a member that was circular in cross-section, that extended laterally across the structural member, and that was spaced six inches on centers from each of the supports. A sharp noise from the member was deemed to indicate failure; it was determined that the foam had pulled away from the metal, and that the metal had collapsed.
>
> "The procedure described in the previous paragraph was repeated, except that the aluminum member was lined with a thin polyethylene sheet before the foamable composition was poured therein. The polyethylene sheet prevented the foam from adhering to the aluminum so that a body of the foam could be removed from the mold after foaming and initial cure. After the foam had cured for about 48 hours, it was suspended as described above and subjected to a load applied as described. Failure occurred at an applied load of 700 pounds."

Murdock does not anticipate claims 7 and 9 because it does not disclose the "chemically and mechanically bonded" limitation of the claims. Indeed, the reference does not even disclose the "body of a thermoset, cellular urethane" which is recited in lines 1 and 2 of claim 7. As noted above[1], Murdock discloses that the building construction panel 20 is modified "so as to in essence form an open-top reservoir into which a suitable foam insulation is poured." A foam insulation that can be poured is not the "body of a thermoset cellular urethane" of claim 7, and the reference does not disclose any method step which would convert the "suitable foam insulation" poured into the "open top reservoir" to the "body of a thermoset cellular urethane" recited by claim 7. In view of the information in the two paragraphs from the instant application which are quoted on page 13 of this communication, the claimed subject matter as a whole (which has been held to include the properties of the article or the like defined by the claims, numbers 7 and 9 in the present case, would not have been obvious from Murdock, at the time the instant invention was made, to a person having ordinary skill in the relevant art. Reconsideration and withdrawal of the rejection of claims 7 and 9 on Murdock and an action on the merits of claims 26-28 and on the merits of the other claims which have been held to be "withdrawn" are respectfully requested.

Various assertions in the following paragraphs which are quoted from the December 4, 2003 Official action (page 3, line 3 of numbered section 4 through the end of section 4) are respectfully challenged, for the reasons indicated below.

> "Murdock teaches all the limitations of the above claims including a body (84) of thermoset cellular urethane (column 1, lines 11-20)[2], body being right rectangular parallelepipedal in shape (Figure 7), two opposed major surfaces with sheet metal layers

[1] See the final paragraph on page 10 of this communication.

[2] The portion of the reference which is cited refers to prior art, not to the invention of the patent; it does not characterize the polyurethane as "thermoset; and it does not use the reference numeral 84. Indeed, the reference numeral 84 appears in Fig. 7 of Murdock, and is described as follows: "A sheet metal outer skin 74 is disposed substantially at the exterior of the main body portion and has opposed front and back portions 76,78 adjoined by first and second side portions 80,82 to form a substantially hollow core 84, with an insulative material disposed within the substantially hollow core 84." (column 7, last line to column 8, line 5)

Murdock does not anticipate claims 7 and 9 because it does not disclose the "chemically and mechanically bonded" limitation of the claims. Indeed, the reference does not even disclose the "body of a thermoset, cellular urethane" which is recited in lines 1 and 2 of claim 7. As noted above[1], Murdock discloses that the building construction panel 20 is modified "so as to in essence form an open-top reservoir into which a suitable foam insulation is poured." A foam insulation that can be poured is not the "body of a thermoset cellular urethane" of claim 7, and the reference does not disclose any method step which would convert the "suitable foam insulation" poured into the "open top reservoir" to the "body of a thermoset cellular urethane" recited by claim 7. In view of the information in the two paragraphs quoted above, the claimed subject matter as a whole (which has been held to include the properties of the article or the like defined by the claims, numbers 7 and 9 in the present case would not have been obvious from Murdock, at the time the instant invention was made, to a person having ordinary skill in the relevant art. Reconsideration and withdrawal of the rejection of claims 7 and 9 on Murdock and an action on the merits of claims 26-28 and on the merits of the other claims which have been held to be "withdrawn" are respectfully requested.

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(76-78) mechanically and chemically bonded to the body (column 8, last line through column 9, lines 1-6)[3]

* * *

"The Murdock reference clearly teaches outer metal skins and a urethane body. The applicant provides arguments that the Murdock reference does not teach the urethane body chemically and mechanically bonded to the metal skins. The Examiner maintain that since the foam is poured into the metal outer surfaces the chemical process of hardening causes the mechanical bonding of the urethane body and the metal sheet[4]. Thus a mechanically and chemically bond. The Examiner further contends that the Applicant's specification when describing the species of figure 29 provides for the same process of fill the space with the urethane and allowing it to set (Applicants' specification, page 44, lines 11-12)[5]. All the structural limitations of the claims are met by the reference."

The portions of Murdock to which the foregoing quotations refer are as follows:

"In previous patented designs, there have been a large variety of modular building panels including pre-fabricated panels of many types. A common type of building panel includes a pair of planar surfaces consisting of sheet metal skins, interspersed with a polymer foam such as polyurethane or polystyrene; which results in a panel of light weight. Other panels have been designed with a honeycomb material within the planar skins, to create a lightweight panel with great insulation values." (column 1, lines 11-20)

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[3] The reference discloses that there are sheet metal surfaces 76-78, but not that they are chemically or mechanically bonded to the foam. Indeed, as noted above, the reference says "During manufacture of the first preferred embodiment of the building construction panel 20, the second skin element 41 is placed horizontally with the back portion 28 resting on a suitable support and the . . . first and second side portions 30,32 and the rib member 50 projecting upwardly. Temporary inserts (not shown) are placed in substantially sealed relation with respect to the ends of the building construction panel 20, so as to in essence form an open-top reservoir into which a suitable foam insulation is poured."

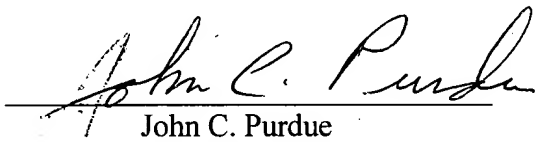
[4] Murdock does not say that the poured foam hardens, does not say that there is either chemical or mechanical bonding. The reference says only that "a suitable foam insulation is poured" into what amounts to an open top mold Indeed, as noted above, when the "suitable foam insulation" is poured, the mold is not even closed.

[5] The applicant does not pour a "suitable foam insulation", but a foamable composition which reacts to produce a blowing agent and to form a thermoset urethane.

"The urethane fire retardant core is of high density, which is adapted to varying specifications depending on application and panel thickness. This urethane core fills fully all the spaces and vacant interstices within the panel once the continuous member steel "Z" or "C" section has been placed and secured to the top and bottom steel sheaths of the panel, such as by stitch welding." (column 8, last line, through column 9, line 6)

The foregoing discussion is believed to have demonstrated that claims 7 and 9 are patentable over Murdock. A withdrawal of that rejection, allowance of claims 7 and 9, and an action on the merits of the claims that have been held to ber withdrawn and on new claims 25, 26 and 27 are respectfully requested.

Respectfully submitted,



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